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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,010	03/24/2004	Daniel James Kane		5687

7590 02/28/2006

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EXAMINER	
LYONS, MICHAEL A	
ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 02/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/808,010	KANE, DANIEL JAMES
	Examiner	**Art Unit**
	Michael A. Lyons	2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *062504*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Drawings

Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are with regards to the generation in real time of a feedback parameter providing information characterizing the real time phase retrieval clause in each claim. It is unclear as to what the feedback parameter is being applied to, since feedback is generally used in the art as a control operation to control overall operation of a device in response to the measured signal that generates the feedback.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are with regards to the performance of a control operation in response to the feedback parameter, as it is unclear as to what the feedback parameter is actually being applied to.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 8-11, 13-14, 16-17, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kane et al ("Real-time inversion of polarization gate frequency-resolved optical gating spectrograms") in view of Palese (6,570,704), as best understood by the examiner.

Regarding claim 1, Kane discloses a method for real-time measurement of ultrashort laser pulses comprising recording in a computer measured frequency resolved optical gating (FROG) trace data, the trace data generated by processing a pulse in a FROG device (see Fig. 2), processing the measured FROG trace data to perform real time phase retrieval and generating in real time a retrieved pulse from the measured FROG trace (see Fig. 3 and pg. 1142, col. 2 – pg. 1143, col. 3), and displaying the retrieved pulse (Fig. 3).

Kane, however, fails to disclose generating in real time a feedback parameter providing information characterizing the real time phase retrieval.

Palese (Fig. 4) discloses that an electric field and phase measurement reconstruction technique reliant on FROG can use the FROG measurements in a feedback loop 350, 352 generated by computer 328 as phase control feedback to the optical system.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the measured phase retrieval signal of Kane as a feedback parameter as per Palese, the motivation being that the application of a feedback loop to the Kane device will allow for any errors in the pulse measurement to be quickly compensated for, leading to the generation of more accurate results.

As for claim 2, Kane discloses a FROG trace error of ~1% (pg. 1143, col. 2).

As for claim 3, Kane discloses a display of measured and retrieved FROG traces in Fig. 3.

As for claim 4, the use of a previous result as a starting point for a subsequent retrieval is inherent to the use of a feedback loop in an optical system.

As for claim 5, Kane discloses "after averaging is complete, the resampled FROG trace is detrended by setting the average of the FROG trace background to zero and by removing any slope on the background; negative intensities are kept to suppress spurious noise in the wings of the retrieved pulse" (pg. 1142, col. 2).

As for claim 8, Kane discloses, "To improve the reconstruction of the retrieved pulse, an analog computation of the square root of the density is completed before digitization by setting the gamma of the video camera as close to 0.5 as possible" (pg. 1142, col. 1 – col. 2).

As for claim 9, Kane discloses the use of principal component generalized projections processing (pg. 1140, col. 2).

Regarding claim 10, Kane discloses a method of performing real time phase retrieval processing of frequency resolved optical gating (FROG) traces, the method comprising receiving as an input a measured FROG trace data set, the FROG trace data set generated by processing a pulse in a FROG device (see Fig. 2), processing the measured FROG trace data set to perform real time phase retrieval and generating in real time a retrieved pulse from the measured FROG trace (see Fig. 3 and pg. 1142, col. 2 – pg. 1143, col. 3), and generating displays of the retrieved pulse at a rate of 3 Hz or faster ("the raw video is displayed at roughly 18 frames/s", pg. 1142, col. 2).

Kane, however, fails to disclose generating a feedback parameter providing information characterizing the real time phase retrieval.

Palese (Fig. 4) discloses that an electric field and phase measurement reconstruction technique reliant on FROG can use the FROG measurements in a feedback loop 350, 352 generated by computer 328 as phase control feedback to the optical system.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the measured phase retrieval signal of Kane as a feedback parameter as per Palese, the motivation being that the application of a feedback loop to the Kane device will allow for any errors in the pulse measurement to be quickly compensated for, leading to the generation of more accurate results.

As for claim 11, Kane discloses the use of principal component generalized projections processing (pg. 1140, col. 2), which is a computer-based algorithm.

Regarding claim 13, Kane discloses a method for real-time measurement of ultrashort laser pulses comprising recording in a computer measured frequency resolved optical gating

(FROG) trace data, the trace data generated by processing a pulse in a FROG device (see Fig. 2), processing the measured FROG trace data to perform real time phase retrieval and generating in real time a retrieved pulse from the measured FROG trace (see Fig. 3 and pg. 1142, col. 2 – pg. 1143, col. 3), and displaying the retrieved pulse (Fig. 3).

Kane, however, fails to disclose generating a feedback parameter providing information characterizing the real time phase retrieval and using the parameter to perform a control operation.

Palese (Fig. 4) discloses that an electric field and phase measurement reconstruction technique reliant on FROG can use the FROG measurements in a feedback loop 350, 352 generated by computer 328 as phase control feedback to the optical system.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the measured phase retrieval signal of Kane as a feedback parameter as per Palese, the motivation being that the application of a feedback loop to the Kane device will allow for any errors in the pulse measurement to be quickly compensated for, leading to the generation of more accurate results.

As for claim 14, the use of a previous result as a starting point for a subsequent retrieval is inherent to the use of a feedback loop in an optical system.

As for claim 16, Kane discloses a FROG trace error of ~1% (pg. 1143, col. 2).

As for claim 17, Kane discloses a display of measured and retrieved FROG traces in Fig. 3.

As for claim 19, Kane discloses, "To improve the reconstruction of the retrieved pulse, an analog computation of the square root of the density is completed before digitization by setting the gamma of the video camera as close to 0.5 as possible" (pg. 1142, col. 1 – col. 2).

As for claim 21, Kane discloses the use of a video camera and frame grabber (pg. 1140, col. 2).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kane et al and Palese as applied to claim 1 above, and further in view of Jefferson (5,642,161).

As for claim 6, the combined device discloses the recording of a signal pulse with a camera, the signal pulse generated within the FROG device from the pulse, the camera performing gamma correction (pg. 1141, col. 2 – pg. 1142, col. 2), and producing the measured FROG trace from output of the camera using a frame grabber (pg. 1142, col. 2).

The combined device fails to disclose the use of reverse gamma correction to preprocess the measured FROG trace.

Jefferson discloses an image monitoring system (Fig. 1) that relies on reverse gamma correctors 108 prior to the filtering and processing of the detected signal.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use reverse gamma correction on the combined device's signal as per Jefferson, the motivation being that the reverse gamma correction produces modified signals which are proportional to the light entering the camera (Col. 2, lines 10-15), removing unwanted artifacts in the signal and reducing the error in the final product.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kane et al and Palese as applied to claim 1 above, and further in view of Kane ("Recent Progress Toward Real-Time Measurement of Ultrashort Laser Pulses").

As for claim 7, the combined device discloses the claimed invention as discussed with regards to claim 1, but fails to disclose filtering the measured FROG trace to reduce a magnitude of artifacts in the trace prior to the phase retrieval processing.

Kane discloses the use of a 15-lement finite impulse response digital filter (pg. 427, col. 2) that filters the raw data before input into the processing algorithm.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to filter the acquired signal of the combined device as per Kane, the motivation being that filtering removes the unwanted frequencies from the captured signal, leading to a more accurate FROG trace.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kane et al and Palese as applied to claims 10 and 11 above, and further in view of Jefferson (5,642,161).

As for claim 12, the combined device discloses the recording of a signal pulse with a camera, the signal pulse generated within the FROG device from the pulse, the camera performing gamma correction (pg. 1141, col. 2 – pg. 1142, col. 2), and producing the measured FROG trace from output of the camera using a frame grabber (pg. 1142, col. 2).

The combined device fails to disclose the use of reverse gamma correction to preprocess the measured FROG trace.

Jefferson discloses an image monitoring system (Fig. 1) that relies on reverse gamma correctors 108 prior to the filtering and processing of the detected signal.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use reverse gamma correction on the combined device's signal as per Jefferson, the motivation being that the reverse gamma correction produces modified signals which are proportional to the light entering the camera (Col. 2, lines 10-15), removing unwanted artifacts in the signal and reducing the error in the final product.

Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kane et al and Palese as applied to claim 13 above, and further in view of Kane ("Recent Progress Toward Real-Time Measurement of Ultrashort Laser Pulses").

As for claim 15, the combined device discloses the claimed invention as discussed with regards to claim 13, but fails to disclose the input being a Gaussian pulse having random phase.

Kane discloses the use of a Gaussian pulse as the input into the device.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a Gaussian pulse as the input for the combined device as per Kane, the motivation being that "like all FROG trace inversion algorithms, the PCGPA is started using Gaussian pulses with random phase for the initial guess for E(t)" (pg. 424, col. 2).

As for claim 18, the combined device discloses the claimed invention as discussed with regards to claim 13, but fails to disclose filtering the measured FROG trace to reduce a magnitude of artifacts in the trace prior to the phase retrieval processing.

Kane discloses the use of a 15-lement finite impulse response digital filter (pg. 427, col. 2) that filters the raw data before input into the processing algorithm.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to filter the acquired signal of the combined device as per Kane, the motivation being that filtering removes the unwanted frequencies from the captured signal, leading to a more accurate FROG trace.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kane et al and Palese as applied to claim 13 above, and further in view of Jefferson (5,642,161).

As for claim 12, the combined device discloses the recording of a signal pulse with a camera, the signal pulse generated within the FROG device from the pulse, the camera performing gamma correction (pg. 1141, col. 2 – pg. 1142, col. 2), and producing the measured FROG trace from output of the camera using a frame grabber (pg. 1142, col. 2).

The combined device fails to disclose the use of reverse gamma correction to preprocess the measured FROG trace.

Jefferson discloses an image monitoring system (Fig.1) that relies on reverse gamma correctors 108 prior to the filtering and processing of the detected signal.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use reverse gamma correction on the combined device's signal as per Jefferson, the motivation being that the reverse gamma correction produces modified signals which are proportional to the light entering the camera (Col. 2, lines 10-15), removing unwanted artifacts in the signal and reducing the error in the final product.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lyons whose telephone number is 571-272-2420. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAL
February 22, 2006

Gregory J. Toatley, Jr.
Supervisory Patent Examiner